

Amendments to the Claims

1. (Withdrawn) Steel for mechanical construction, wherein its composition in percentages by weight is:

- $0.35\% \leq C \leq 1.2\%$
- $0.10\% \leq Mn \leq 2.0\%$
- $0.10\% \leq Si \leq 3.0\%$
- $traces \leq Cr \leq 4.5\%$
- $traces \leq Mo \leq 2.0\%$
- $traces \leq Ni \leq 4.5\%$
- $traces \leq V \leq 0.5\%$
- $traces \leq Cu \leq 3.5\%$ with $Cu \leq Ni\% + 0.6 Si\%$ if $Cu \geq 0.5\%$
- $traces \leq P \leq 0.200\%$, $traces \leq Sn \leq 0.150\%$, $traces \leq As \leq 0.100\%$, $traces \leq Sb \leq 0.150\%$, with $0.050\% \leq P\% + Bi\% + Sn\% + As\% + Sb\% \leq 0.200\%$,
- $traces \leq Al \leq 0.060\%$
- $traces \leq Ca \leq 0.050\%$
- $traces \leq B \leq 0.01\%$
- $traces \leq S \leq 0.0200\%$
- $traces \leq Te \leq 0.020\%$
- $traces \leq Se \leq 0.040\%$
- $traces \leq Pb \leq 0.070\%$
- $traces \leq Nb \leq 0.050\%$
- $traces \leq Ti \leq 0.050\%$

the remainder being iron and impurities resulting from the manufacture.

2. (Withdrawn) Steel as claimed in Claim 1, wherein its Si content is between 0.10% and 1.0%.

3. (Withdrawn) Steel as claimed in Claim 1, wherein the ratio Mn%/Si% is greater than or equal to 0.4.

4. (Withdrawn) Steel as claimed in Claim 2, wherein the ratio Mn%/Si% is greater than or equal to 0.4.

5. (Currently amended) Method of hot-shaping a steel part, wherein:

~~— a billet of steel is obtained with the following composition in percentages by weight;~~

~~— $0.35\% \leq C \leq 1.2\%$~~

~~— $0.10\% \leq Mn \leq 2.0\%$, preferably with $Mn\%/Si\% \geq 0.4$~~

~~— $0.10\% \leq Si \leq 3.0\%$, preferably $0.10\% \leq Si \leq 1.0\%$~~

~~— $traces \leq Cr \leq 4.5\%$~~

~~— $traces \leq Mo \leq 2.0\%$~~

~~— $traces \leq Ni \leq 4.5\%$~~

~~— $traces \leq V \leq 0.5\%$~~

~~— $traces \leq Cu \leq 3.5\%$ with $Cu \leq Ni\% + 0.6 Si\%$ if $Cu \geq 0.5\%$~~

~~— $traces \leq P \leq 0.200\%$, $traces \leq Sn \leq 0.150\%$, $traces \leq As \leq 0.100\%$, $traces \leq Sb \leq 0.150\%$, with $0.050\% \leq P\% + Bi\% + Sn\% + As\% + Sb\% \leq 0.200\%$;~~

~~— $traces \leq Al \leq 0.060\%$~~

~~— $traces \leq Ca \leq 0.050\%$~~

~~— $traces \leq B \leq 0.01\%$~~

~~— $traces \leq S \leq 0.0200\%$~~

~~— $traces \leq Te \leq 0.020\%$~~

~~— $traces \leq Se \leq 0.040\%$~~

~~— $traces \leq Pb \leq 0.070\%$~~

~~— $traces \leq Nb \leq 0.050\%$~~

~~— $traces \leq Ti \leq 0.050\%$~~

~~the remainder being iron and impurities resulting from the manufacture.~~

~~— a heat treatment is if need be applied to it, which gives it a globular primary structure;~~

~~— it is heated to an intermediate temperature between its solidus temperature and its liquidus temperature under conditions such that the solid fraction has a globular structure;~~

~~thixo~~forging of the said billet is carried out so as to obtain the said part;

~~and cooling of the said part is carried out~~

A method of hot-shaping a steel part, which comprises obtaining a billet of steel with the following composition in percentages by weight:

$0.35\% \leq C \leq 1.2\%$

$0.10\% \leq Mn \leq 2.0\%$

$0.10\% \leq Si \leq 3.0\%$

traces $\leq Cr \leq 4.5\%$

traces $\leq Mo \leq 2.0\%$

traces $\leq Ni \leq 4.5\%$

traces $\leq V \leq 0.5\%$

traces $\leq Cu \leq 3.5\%$ with $Cu \leq Ni\% + 0.6 Si\%$ if $Cu > 0.5\%$

traces $\leq P \leq 0.200\%$, traces $\leq Sn \leq 0.150\%$, traces $\leq As \leq 0.100\%$, traces $\leq Sb \leq$

0.150% , with $0.050\% \leq P\% + Bi\% + Sn\% + As\% + Sb\% \leq 0.200\%$,

traces $\leq Al \leq 0.060\%$

traces $\leq Ca \leq 0.050\%$

traces $\leq B \leq 0.01\%$

traces $\leq S \leq 0.200\%$

traces $\leq Te \leq 0.020\%$

traces $\leq Se \leq 0.040\%$

traces $\leq Pb \leq 0.070\%$

traces $\leq Nb \leq 0.050\%$

traces $\leq Ti \leq 0.050\%$

the remainder being iron and impurities resulting from the manufacture;

heating the billet to an intermediate temperature between its solidus temperature and its liquidus temperature under conditions such that the solid fraction of the billet has a globular structure;

thixoforging the billet so as to obtain the said part;

and cooling the said part.

6. (Currently Amended) The method according to Method as claimed in Claim 5, wherein the said thixoforging takes place in a zone of temperatures where the liquid material fraction present in the billet is between 10 and 40%.
7. (New) The method according to Claim 5, wherein the Mn and Si contents of the billet satisfy the relationship $\text{Mn\%/Si\%} \geq 0.4$.
8. (New) The method according to Claim 5, wherein $0.10\% \leq \text{Si} \leq 1.0\%$.
9. (New) The method according to Claim 5, which further comprises heat treating the billet to give the billet a globular primary structure, before heating the billet to the intermediate temperature.